

Around the Laboratories

— in the more complicated cases, this will greatly reduce the time formerly wasted in trial-and-error settings;

3) to calibrate the beam easily, thus helping the experimenters considerably.

The equipment was first used in June to calibrate the p5 beam in the East Hall, and gave an accuracy of 0.5% on the momentum measurements. Some improvements have since been made in order to increase the flexibility and to provide even better accuracy.

Linac troubles

From the beginning of July the performance of the 50 MeV linac feeding the proton synchrotron became erratic and in the middle of the month the PS was stopped (from 17 to 19 July) in an attempt to find and cure the source of the trouble. It was brought back on the air at reduced power. The output current at 50 MeV was limited to about 55 mA rather than the usual hefty beam of 110 mA. This was because the beam loading in tank 3 could not be compensated for an intense accelerated beam. Fortunately the effect on the PS accelerated intensity was comparatively small causing a reduction in the average beam from 1.5 to 1.4×10^{12} protons per pulse.

The difficulties seem to have been caused initially by a detecting loop which was protruding too far into an r.f. power line by about 1 mm. The extent of the sparking damage at this point suggested that breakdown had occurred steadily for some time, and had progressively broken down cables and components by reflection over-voltages. It had also indirectly led to further breakdown elsewhere by requiring other parts of the r.f. system to run at voltages higher than normal in order to compensate for the loss of power.

Contributing to the problems also was the slightly lower power capacity of a new set of cables from a different manufacturer, and low gain in one of the beam loading compensation power amplifiers. The system was tuned up again satisfactorily at the beginning of August, but it has been decided to replace the amplifier during the next maintenance period.

SERPUKHOV Experimental programme

At the beginning of August several scientists from the Institute of High Energy Physics at Serpukhov visited CERN. They saw the progress on the items of equipment (fast ejection system, r.f. separators) being prepared for use on the 76 GeV synchrotron at Serpukhov and studied other aspects of CERN's work, particularly the data handling facilities for bubble chamber film. While they were at CERN, Professor A.A. Logunov, Director of the Institute, gave a special seminar to theoreticians and a general seminar, together with Dr. V.A. Yarba, on the experimental programme at Serpukhov. The following information was drawn from the general seminar.

Professor Logunov began by expressing his great satisfaction with the progress of the CERN-Serpukhov collaboration both in terms of the joint experiments and of the development of machine equipment. He expressed his confidence that the

collaboration which has begun so very well will prove still more fruitful for both Laboratories in the future.

Performance of the accelerator

In 1969 the 76 GeV proton synchrotron operated for 3700 hours of which 3000 hours were used for the physics research programme. The peak beam intensity was 1.5×10^{12} and the average per cycle was 0.6×10^{12} . The magnet cycle flat-top at all energies up to 70 GeV was up to 1.5 s long and usually two or three experiments were taking data simultaneously with a spill time of 0.3 to 0.5 s. A fast spill suitable for bubble chamber physics has also been achieved. The machine schedule was 20 days of continuous operation followed by a 10 day shutdown.

In the first half of 1970 the accelerator operated for 2000 hours and the reliability of all components is being steadily improved. A long shutdown began on 20 July (it will extend to 15 October) and will be occupied mainly in preparations for the fast ejection system.

EXPERIMENTS AT SERPUKHOV

Beam channel	Experiment
Beam 2 (30-65 GeV/c)	1. Total cross-section measurements 2. Elastic scattering 3. 6 m spectrometer
Beam 4 (20-45 GeV/c)	4. Pion-proton charge exchange 5. Pion-neutron backward scattering 6. Search for heavy particles and antinuclei 7. CERN-Serpukhov missing mass spectrometer 8. 2 m heavy liquid bubble chamber from Dubna
Neutral Beam	9. Neutral kaon, regeneration on hydrogen
Internal Beam	10. Elastic proton-proton and proton-deuterium scattering